

CHAPTER 25. LIFTING AND CARRYING APPARATUS

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Subchapter A. PLANT RAILWAYS

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Authority

The provisions of this Subchapter A issued under act of June 2, 1913 (P. L. 396, No. 267) (71 P. S. §§ 1441—1451); and act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15), unless otherwise noted.

Source

The provisions of this Subchapter A adopted January 1, 1919, amended through May 1, 1967, unless otherwise noted.

Cross References

This subchapter cited in 34 Pa. Code § 11.85 (relating to applicable provisions of other regulations).

GENERAL PROVISIONS**§ 25.1. Scope.**

This subchapter sets forth rules to safeguard the lives, limbs and health of those who work on or near plant railways, and places the responsibility of complying with the rules upon both employer and employe.

§ 25.2. Applicability.

The standards set forth in this subchapter apply to those railways in or about industrial plants which are not operated by a common carrier but by the owners of the plant. The provisions apply to both standard gauge and narrow gauge equipment, which is handled by power, except where otherwise stated.

§ 25.3. Employment of minors.

No minor under 18 years of age shall be employed or permitted to work at switch tending, at gate tending, at track repairing, as a brakeman, fireman, engineer, motorman or conductor upon a railroad or railway.

§ 25.4. Physically deficient employes.

No person deficient in hearing, visual power, color perception or otherwise physically deficient shall be employed in or about a railway at any work where such defect will create a hazardous condition.

§ 25.5. Penalty.

Any person who violates any of the provisions of this subchapter and any regulations of the Department or who interferes with the Department or its authorized representatives in the enforcement of the provisions or regulations shall be subject to summary proceedings before an alderman, magistrate, or justice of the peace, and upon conviction shall be penalized under the provisions of section 15 of act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15).

GENERAL REQUIREMENTS**§ 25.11. Rolling stock equipment.**

(a) *All cars.* Wherever practicable, all cars shall be promoted with either automatic or link and pin couplers, and automatic couplers should be employed in new installations. Cars shall be in proper and safe condition, and all cases of defective couplers, brakes, steps, handholds, lamps and other parts shall be reported by the person in charge of the crew to the proper authority without unreasonable delay.

(b) *Coupler adjustment and coupling.* The development and use of devices or methods for safety adjusting couplers or performing couplings automatically is strongly recommended.

(c) *Special cars.* Special cars for skelp steel and the like should be provided with suitable side stakes or end stakes, or be otherwise suitably equipped. Special cradle cars should be used to handle hot crop ends and the like.

(d) *Locomotives.* Locomotives or motor cars shall be in proper and safe condition and be supplied with necessary working tools, supplies and a full set of signals necessary for proper operation. The absence of any of these items shall be reported by some designated person to the proper authority without unreasonable delay.

(e) *Switching locomotives.* It is recommended that all switching locomotives be equipped at both ends with platforms above the couplers, together with hand rails and steps.

(f) *Locomotive boiler inspection.* Locomotive boilers, not subject to inspection under the Federal laws, and their appurtenances shall be thoroughly inspected annually, internally and externally, and under operating conditions, and may not be operated at pressures in excess of the safe working pressure stated in the certificate of inspection. These inspections shall be made by inspectors who have qualified before the examining board of the Department.

§ 25.12. Roadway equipment.

(a) *Grade crossings.* Important grade crossings should be eliminated by the use of overhead bridges or subways. Where this is impracticable, such grade crossings shall be properly safeguarded by the use of gates, bells, watchmen, lights or other suitable means.

(b) *Dead end tracks.* Dead end tracks, where a hazard to life or property exists, shall be provided with substantial bumping blocks, or equivalent equipment.

(c) *Frogs, switches and guard rails.* Frogs, switches and guardrails shall be provided, in a protective manner, with suitable blocks of wood or metal.

(d) *New switch stands.* When new switch stands are installed, they shall be constructed so that the lever will be thrown parallel with the rails.

(e) *Trestles.* On trestles where persons are permitted to walk, there shall be a walkway on at least one side extending to at least 5 feet 1 inch from the nearest rail, and the outer edge of the walkway shall be equipped with a standard railing; on multitrack trestles the walkway, without railing, may be between tracks. When dumping is done on trestles, all sides of tracks shall be accessible either by means of walkways or working platforms, portable or otherwise.

(f) *Trestles above work areas or passageways.* When there is a designated passageway, or men regularly work under a trestle not used for dumping purposes, the trestle shall be planked over in such satisfactory manner as to prevent objects falling from the rolling stock or trestle.

(g) *Precautions regarding track hoppers.* Track hoppers under tracks for the unloading of coal or other material from dumping cars should either be covered with a grating so as to catch a man should he fall into a hopper, or, in lieu of such

grating, safety belts should be worn by men when it is necessary for them to go into hopper cars to assist the unloading.

§ 25.13. Signals and signs.

(a) A signal incorrectly displayed at any point, or the absence of a signal at a place where a signal is usually shown, shall be regarded as a stop signal, and shall be investigated and reported to the proper authority at once.

(b) If buildings, poles or other structures are so located relative to the track as to not afford sufficient clearance for a trainman on the side of a car, there shall be suitable warning signs to readily indicate the danger to the trainman aboard the approaching train.

(c) When cars cannot be stationed on main leads so as to be readily visible, suitable warning signs shall be provided.

(d) When workmen loading or unloading cars are likely to be injured by movement of the cars, a suitable warning sign shall be displayed at each accessible end of the car or depth to warn trainmen against making a coupling.

(e) When repairs on or about rolling stock requires workmen to go under the equipment, the accessible ends of the car, locomotive or depth shall be protected by a portable derailer or a suitable warning signal to prevent trainmen from making a coupling.

§ 25.14. Clearances for standard gauge tracks.

(a) *Minimum side clearance.* For standard gauge tracks the minimum side clearance shall, whenever practicable, be as follows:

(1) From the gauge line of the nearest rail to loading or unloading docks, walls of depressed tracks and wheelbarrow platforms, 3 feet 4 inches.

(2) From the gauge line of the nearest rail to all stock yards, 5 feet on tangent track and 5 feet 6 inches on curve track.

(3) From the gauge line of the nearest rail to all other structures not noted in paragraphs (1) and (2), 6 feet.

(b) *Minimum overhead clearance.* For standard gauge tracks the minimum overhead clearance shall, wherever practicable, be as follows:

(1) From top of rail to any wire structure, 22 feet.

(2) From top of rail to any high tension transmission line, 35 feet.

(c) *Head tappers.* For standard gauge track where it is impossible to have an overhead clearance of 22 feet or more above the top of the rail, suitable head tappers shall be placed at proper distances on each side of the structure.

(d) *Adjacent tracks.* For standard gauge track the minimum distance between nearest gauge lines of adjacent tracks shall be 7 feet 3 1/2 inches.

§ 25.15. Narrow gauge tracks.

On narrow gauge track safe clearances shall be maintained at all times.

ROADWAY OPERATION**§ 25.21. Conduct of railway personnel.**

(a) *Unauthorized riders.* Unless properly authorized, no person whose duty does not require it shall be allowed to ride on a locomotive or train.

(b) *Locomotive operation.* Unless properly qualified and duly authorized, yardmasters and trainmen shall not operate a locomotive.

(c) *Boarding a moving train.* Trainmen shall not stand between the occupied rails to board an approaching locomotive or car.

(d) *Control of trains descending an incline.* When descending an incline, the engineer shall always have his train under control and be prepared to stop at any time.

§ 25.22. Railway movement and traffic.

(a) *Movement relative to railway buildings.* Before cars are moved into or out of a railway building or before coupling is made to any car within a building, a trainman shall walk the full length of the cars to insure that no one will be injured by the train movement and that all obstructions are removed.

(b) *Insuring clear tracks.* There shall always be a member of the crew at the head end of a moving train to warn anyone along the track who may be in danger, except when hot metal or hot cinders are being handled. With the locomotive pointed forward at the head end of the train, the engineer in his proper place in the cab shall be regarded as being at the head end of the train. When a train is moving on tracks where vision is obstructed, it shall be ascertained by some member of the crew that the track is clear before movement proceeds.

(c) *Starting signals.* The engineer shall not knowingly act on a starting signal given by any person except a member of the crew. No person other than a member of the crew shall couple or uncouple cars.

(d) *Precedence of trains on intersecting tracks.* Where one track crosses another track, there shall be established a rule giving trains on one track precedence over those on the other track, at the point of intersection.

§ 25.23. Coupling and uncoupling.

(a) Trainmen shall not go between cars to pull pins while the cars are in motion. Links may not be guided into the draw head by hand; a pin or stick may be used for this purpose. Drawheads or knuckles shall not be pushed over with the foot; the train shall be standing still when drawheads or knuckles are shifted. No attempt shall be made to pull pins or make couplings on the inside of a curve.

(b) Trains shall be brought to a complete stop before cars are disconnected.

(c) Cars disconnected from motive power shall be blocked or have the hand brakes properly set.

§ 25.24. Improperly loaded cars.

No improperly loaded car shall be handled so as to endanger life or property.

§ 25.25. Derailing switches.

Derailing switches shall be opened and remain open after cars have passed through.

Subchapter B. CRANES, BOOMS AND HOISTS**GENERAL PROVISIONS**

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Authority

The provisions of this Subchapter B issued under act of June 2, 1913 (P. L. 396, No. 267) (71 P. S. §§ 1441—1451); and section 15 of the act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15), unless otherwise noted.

Source

The provisions of this Subchapter B adopted July 8, 1924; amended through October 1, 1969, unless otherwise noted.

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Cross References

This Subchapter cited in 34 Pa. Code § 11.85 (relating to applicable provisions of other regulations); and 34 Pa. Code § 39.29 (relating to conveyors, hand and automotive vehicles)

GENERAL PROVISIONS**§ 25.31. Definitions.**

The following words and terms, when used in this subchapter, have the following meanings, unless the context clearly indicates otherwise:

Crab or winch—A hand or power-operated machine having a rope coiled on one or more drums for the purpose of hauling, hoisting, or lowering a load. The drums may be mounted on legs or in a frame. The legs or frame may be of wood, metal, concrete, masonry or other solid construction.

Crane—A machine for lifting or lowering a load and moving it horizontally, in which the hoisting mechanism is an integral part of the machine. It may be driven manually or by power and may be a fixed or a mobile machine.

Crawler mounted crane—A crane consisting of a cab and boom mounted on a chassis supported by two or more caterpillar treads provided with power to propel the crane. This term includes all crawler mounted cranes regardless of the attachments used for lifting, lowering and transporting a load. The working attachments shall include power shovels, crane booms, back hoes, telescoping booms and the like.

Gantry crane—A crane the bridge of which is mounted on structural legs. These legs may be fitted with track wheels to which suitable gearing is connected for the purpose of propelling the crane along the track. They may also be fixed on solid foundations.

Guarded, encased or enclosed—The object is so covered, fenced, or surrounded that contact which may result in injury is unlikely.

Hoist—An apparatus for raising or lowering the load by the application of a pulling force, and not including a car or platform running in guides.

Hot metal crane—A crane that is used to raise, lower and transport molten metal.

Jib crane—A crane capable of lifting, lowering, or rotating a load within the scope of a circle covered by a rotating arm or jib and equipped with a trolley traveling on the jib.

Locomotive crane—A crane consisting of a cab and boom or lifting device mounted on trucks provided with a source of power either directly or indirectly obtained, capable of conveying the crane and of rotating, hoisting or lowering the boom or load.

Monorail hoist—A hoist, with or without an operator's cage, which is suspended on rollers or wheels from an overhead track or rail.

Overhead traveling crane—A crane consisting of a bridge mounted on trucks which run on overhead rails, and the hoisting mechanism mounted on trucks which move transversely across the bridge, including single traveling I-beam and transfer cranes.

Pillar crane—A crane capable of lifting, lowering or rotating a load within the scope of a circle scribed by a rotating jib or boom as a radius and consisting of a self-supporting, rotating pillar or mast pivoted at its base, the pillar or mast supporting an inclined jib or boom secured at the base of the pillar.

Truck mounted cranes—A crane consisting of a cab and boom mounted on a chassis supported by four or more wheels, some or all of which are provided with power either directly or indirectly to propel the crane. This term includes mounted cranes regardless of the boom attachments used for lifting, lowering and transporting the load. The boom attachments will include power shovels, crane booms, back hoes, telescoping booms and the like.

§ 25.32. Scope.

(a) This subchapter pertain to cranes, booms and hoists and sets forth rules to safeguard the lives, limbs and health of workers involved in the operation of cranes, booms and hoists.

(b) The sections of this subchapter shall pertain to installations unless otherwise specified as pertaining to new or existing installations.

§ 25.33. Compliance with these regulations.

Where the requirements of this subchapter apply to installations, a period of 6 months after the date of adoption of any revisions or amendments to this subchapter shall be granted for compliance.

§ 25.34. Interpretation.

The special requirements of this chapter may not be construed as exclusive of any of the general requirements of this chapter. In cases of direct conflict special requirements shall govern.

§ 25.35. Penalty.

Anyone who violates any of the provisions of this subchapter or any regulations of the Department or who interferes with the Department or its authorized representative in the enforcement of the provisions or regulations shall be subject to summary proceedings before an alderman, magistrate or district justice, and upon conviction shall be penalized under the provisions of section 15 of act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15).

GENERAL REQUIREMENTS FOR ALL CRANES

§ 25.41. Construction.

(a) *Factor of safety.* The structural steel members shall be designed to conform with the A.I.S.C. Code, as amended. All other apparatus shall be designed with not less than a factor of safety of five under static full-rated load conditions, based on the ultimate strength of the material used, as noted in the following table:

<i>Material</i>	<i>Factor of Safety</i>
Cast iron	12
Cast steel	8
Forged steel	5
Cables and hooks	5

(b) *Capacity notices.* A notice shall be placed on every crane and hoist showing the maximum allowable load in pounds or tons. This notice shall be placed so as to be clearly legible from the floor.

(c) *Lubrication.* The construction of cranes shall be such that all parts may be lubricated and inspected safely when cranes are not in operation. No cranes shall be manually lubricated while in operation.

(d) *Tool boxes.* Where a toolbox or receptacle is used for the storing of oil cans, tools, and the like, it shall be permanently secured in the cage or on the footwalk of outside cranes, and on the footwalk of inside cranes. Toolboxes of hot metal cranes shall be constructed of metal.

(e) *Guarding of gears.* All gears on cranes shall be provided with suitable guards at points of danger to prevent contact.

(f) *Projecting keys.* Keys projecting from revolving shafts shall be guarded.

(g) *Brakes.* A braking apparatus shall be provided on every type of crane and shall be so designed and installed as to be capable of stopping a moving weight of at least 1 1/2 times the full rated load of the crane.

(h) *Unauthorized operators.* Means shall be provided to prevent the starting of equipment by unauthorized persons.

(i) *Control levers.* The control levers of traveling cranes shall be located so that the operator faces the direction of travel.

§ 25.42. Electrical equipment.

(a) *Guarding current-carrying parts.* All exposed current-carrying parts except conductors, connected to circuits above 300 volts to ground, shall be isolated, insulated or guarded. Exposed parts less than 300 volts shall be suitably insulated or guarded to prevent possible accidental contact. Exposed metallic parts of conduit armored cable as malding shall be permanently grounded. Current-carrying parts of electrical equipment such as controllers, motors, transformers, automatic cut-outs, circuit breakers, switches and other like devices shall

be guarded either by locating them so as to be inaccessible to the operator or routine maintenance personnel, or by enclosing these devices in cabinets, casings, or shields of permanently grounded metal or of substantial insulating material.

(b) *Suddenly moving parts.* All parts of electrical equipment, such as fuses and the handles and arc chutes of circuit breakers, shall be isolated or guarded that the possibility of persons being stuck or burned is reduced to a minimum.

(c) *Noncurrent-carrying parts.* All exposed noncurrent-carrying metal parts of electrical equipment shall be permanently grounded. A grounded connection through well bonded track rails will be considered satisfactory.

(d) *Operations near electric lines.* No one shall operate a crane or hoist so that any part thereof, including the load, is within 6 feet of an electric line, unless either adequate mechanical barriers have been erected or the line has been de-energized.

(e) *Warning signs.* Warning signs shall be provided as follows:

(1) The owner, lessee or employer responsible for the operation of any crane or hoist shall post and maintain a durable warning sign, legible at 12 feet by the operator in his normal operating position.

(2) The following is a facsimile of the warning sign (not to scale):

**UNLAWFUL
TO OPERATE
THIS EQUIPMENT
WITHIN SIX FEET
OF AN ELECTRIC LINE**

(3) The warning sign shall consist of white lettering on a red background with at least a 1/4 inch wide white border. The minimum overall dimensions of the sign shall be 10 inches horizontally and 6 inches vertically. Lettering shall follow the horizontal dimensions. The word "unlawful" shall stand alone at the top with letters at least 1 inch in height. The remaining wording shall be printed and spaced on four lines with lettering 5/8 inch in height.

(f) *Exception.* Subsections (d) and (e) may not apply to the following:

(1) The owner or lessee of overhead electric lines and equipment and his authorized representatives.

(2) Overhead traveling cranes.

(g) *Disconnecting source of energy.* Readily accessible means shall be provided whereby all conductors and equipment located in cranes can be completely disconnected from the source of energy at a point as close as possible to the main current collectors.

(h) *Electrical circuits.* The electrical circuit for electric magnets shall be maintained in good condition. Means for taking up the slack cable shall be provided.

(i) *Fuses.* All fuses shall be of the enclosed arcless type.

§ 25.43. Chains and cables.

(a) *Inspection.* All hoist chains including end fastenings should be inspected once every working day. A thorough inspection shall be made at least once a month and a signed report of same kept on file. After a shutdown of a month or more, a thorough inspection shall be made before use. Special attention shall be given to detecting defective welds.

(b) *Double chains.* Bolts or nails may not be placed between two chain links to shorten chains.

(c) *Splicing chains.* Chains may not be spliced with other than approved splicing devices.

(d) *Annealing of chains.* Whenever annealing of chains is attempted, it shall be done in properly equipped annealing furnaces and under the direct supervision of a competent person thoroughly versed in heat treating.

(e) *Inspection of wire ropes.* All running ropes should be inspected every working day by a crane operator. A thorough inspection of ropes shall be made at least once a month and a full written and signed report of rope condition shall be kept on file, and readily available to the Department and its authorized representative. Ropes used on equipment which has been shut down for a period of one month or more shall be given a thorough inspection and full release by the inspector before the equipment is permitted to be used. A report of the rope condition shall be filed.

(f) *Renewal of cables.* Whenever the design factor of safety of any cable has been reduced by 15%, the cable shall be immediately removed.

(g) *Wraps of cable on drums.* There may be not less than two full wraps of hoisting cable on the drums of cranes and hoists at all times of operation.

(h) *Flanges on drums.* Cables shall not be allowed to pile on drums of cranes. The drums shall have a flange at each end to prevent the cables from slipping off the drums.

(i) *Bottom sheaves.* Bottom sheaves shall be protected by close-fitting guards to prevent the rope from being misplaced.

(j) *Reaving.* The reaving shall be of a type and so arranged that ropes will not chafe or abrade while in use.

§ 25.44. Floor operated overhead traveling cranes.

(a) *Aisles.* An unobstructed aisle not less than 3 feet wide shall be maintained for travel of the operator except in these cases where the control handles are hung from the trolleys of traveling cranes.

(b) *Control ropes.* The direction of all movements of the crane shall be clearly indicated so that the operator may become readily familiar with them.

§ 25.45. Operators.

(a) *Authorized operators.* Cranes, derricks and hoists shall be operated only by experienced operators, learners under the supervision of an experienced operator, a crane repair man, or an inspector. Only an authorized person shall enter a crane cab.

(b) *Mental requirements.* No crane shall be operated by any person who is unable to read and understand the signs, notices, and operating instructions and who is not familiar with the signal code used by the floormen.

(c) *Physical requirements.* Cranes shall not be operated by any person having seriously defective eyesight or hearing or suffering from heart disease or similar ailments that may cause fainting as determined by the examining physician. All regular crane operators shall be examined by a physician at least annually.

(d) *Ascending and descending ladders.* Hands shall be kept free when going up and down ladders. Articles which are too large to go into pockets or belts shall be lifted to or lowered from the crane by hand line, except where stairways are provided.

(e) *Cages.* Cages shall be kept free of clothing and other personal belongings. Tools, extra fuses, oil cans, waste and other articles necessary in the crane cage shall be stored in a tool box.

(f) *Crane rules.* The operator shall completely familiarize himself with all crane rules and with the crane mechanism and its maintenance. If adjustments or repairs are necessary, he shall report them at once to the proper authority.

(g) *Eating, reading while on duty.* The operator may not eat or read while actually engaged in the operation of a crane, nor may he operate the crane when he is physically or mentally unfit.

(h) *Lubrication.* The operator or someone specially designated shall properly lubricate all working parts of the crane.

(i) *Daily inspection.* On each day of use, cranes shall be examined by the operator for loose parts or defects.

(j) *Cleaning cranes.* It shall be the responsibility of the operator to clean his respective crane.

(k) *Carrying loads over people.* Operators shall avoid, as much as possible, carrying loads over people. Carrying molten metal or metal with a magnet over people shall be absolutely avoided. If loads have to be carried over people, a warning shall be given. No person may be permitted to stand or pass under an electric magnet in use.

(l) *Closing emergency switch.* When the operator finds the main or emergency switch open, he may not close it, even when starting on regular duty, until he has made sure that no one is on or about the crane. If there is a "Man Working" sign on the switch, he shall not remove it unless placed there by himself; he may not close the switch unless the warning sign has been removed by the man placing it there. He may not oil or repair the crane unless the main switch is open.

(m) *Power off.* If the power goes off, the operator shall immediately throw all controllers to “off” position until power is again available.

(n) *Closing main switch.* Before closing the main switch the operator shall make sure that all controllers are in “off” position until power is again available.

(o) *Tripping limit switches.* When long hitches are made, the operator shall pay special attention to the block, to avoid tripping the limit switch. The operator shall never depend on the limit switch to stop the hoists, but shall control the movement from the cab. At the beginning of his tour of duty, the operator shall test the upper limit switch, under no load. If it does not operate properly, he shall immediately notify the foreman or inspector.

(p) *Signals.* If a warning gong is furnished, it shall be sounded each time before traveling.

(q) *Trolley placement.* Before starting to hoist, the operator shall place the trolley directly over the load to avoid swinging it when being hoisted. This precaution is especially important in the handling of molten metal.

(r) *Side pulls.* Cranes may not be used for side pulls unless authorized by a responsible person who has determined that the stability is not thereby endangered and that the various parts of the crane will not be overstressed. A monorail hoist shall never be used for this purpose.

(s) *Testing hoist brakes.* When handling maximum loads, particularly ladles of molten metal, the operator shall test the hoist brakes after the load has been lifted a few inches; if the brakes do not hold, the load shall be lowered at once and the brakes adjusted or repaired.

(t) *Bumping runway stops or cranes.* Bumping into runway stops or other cranes shall be avoided. When the operator is ordered to engage with or push other cranes, he shall do so with special care for the safety of persons on or below cranes.

(u) *Lowering loads.* When lowering a load, the operator shall proceed carefully to insure that he has the load under safe control.

(v) *Leaving the cage.* When leaving the cab or cage of any equipment referred to in this subchapter, the operator shall place all controls in neutral or “off” position and shall open the main switch or disengage the master clutch.

(w) *Locking the crane.* Before leaving a crane unattended, the operator shall lock the crane to prevent movement in any direction. This requirement may not apply to overhead traveling cranes inside industrial buildings.

(x) *Riding on hooks.* Operators may not permit anyone to ride on the load or hooks.

(y) *Age and sex requirements.* A male under 18 years of age or female under 21 years of age may not be permitted to operate a crane. Application for permission to employ women as crane operators shall be filed with the Department.

§ 25.46. Floormen.

(a) *Signals.* Floormen shall give all signals to the operator in accordance with the established standards.

(b) *Condition and use of hoisting accessories.* Floormen shall be responsible for the condition and use of all hoisting accessories and hitches.

(c) *Empty chain slings.* Before the operator moves a crane from which an empty chain sling is hanging, the floormen shall hook both ends of the sling to the block.

(d) *Walking ahead of loads.* Floormen shall walk ahead of the moving load to warn people to keep clear and to insure that the load is carried high enough to clear all obstructions.

(e) *Extra heavy loads.* Floormen shall notify the foremen in advance when an extra heavy load is to be handled.

§ 25.47. Repairmen.

(a) *Crane location.* When repairs are necessary, repairman shall move the crane to a location where the repair work will least interfere with other cranes and operations.

(b) *Controllers in "off" position.* Before starting repairs, repairmen shall see that all controls are placed in "off" position, and that the main switch or emergency switch is opened. Either the main switch or emergency switch shall be locked or a "Man Working" sign attached.

(c) *Out of order signs.* Repairmen shall immediately place warning signs or "out of order" signs on a crane to be repaired and also either on the floor beneath or hanging from the crane so as to be easily seen from the floor. If other cranes are operated on the same runway, repairmen shall also place rail stops at a safe distance or make other safe provisions.

(d) *Repairing runways.* When repairing runways, repairmen shall place rail stops and warning signs or signals so as to protect both ends of the section to be repaired.

(e) *Loose parts.* Repairmen shall take care to prevent loose parts from falling or being thrown to the floor beneath.

(f) *Replacement of guards and safety devices.* Repairs may not be considered complete until all guards and safety devices are put in place and the block and tackle and other loose material are removed.

OVERHEAD TRAVELING CRANES**§ 25.51. Scope.**

Sections 25.51—25.55 (relating to overhead traveling cranes) shall also govern in the cases of single I-beam and transfer cranes, except when the construction of the cranes precludes a possibility of compliance.

§ 25.52. Construction requirements.

(a) *Overhung gears.* No overhung gears shall be used unless provided with an effective means of keeping them in place. Keys shall be secured in an approved manner to prevent gears from working loose.

(b) *Outriggers for repairs.* If there are no members above an outside overhead traveling crane that are suitable for attaching blocks for repair work and another crane is not available, a structural steel or aluminum outrigger of strength sufficient to lift the heaviest part of the trolley shall be provided.

(c) *Locking of cranes.* Approved locks shall be installed to prevent outside overhead traveling cranes from being blown along or off the tracks by severe winds.

(d) *Brakes for bridge travel.* Foot brakes, or other effective means, shall be provided to control the bridge travel of all overhead traveling cranes.

Cross References

This section cited in 34 Pa. Code § 25.51 (relating to scope).

§ 25.53. Platforms and footwalks.

(a) *Changing truck wheels.* Platforms shall be provided for changing and repairing truck wheels on end trucks.

(b) *Access to crane cages.* A platform or footwalk shall be located on the crane or crane runway to give access to the crane cage, and it shall be accessible from one or more stairways or fixed ladders. This platform or footwalk may be not less than 18 inches wide.

(c) *Stairways and ladders.* When stairways are used to give access to platforms they shall make an angle of not more than 50° with the horizontal and shall be equipped with substantial railing. If ladders are used to give access to platforms, they may extend not less than 36 inches above the platform. Railed stairways or ladders used as means of ingress and egress to crane cages shall be located so as to prevent the operator or other persons from coming into contact with live lines feeding runway or other parts of the crane equipment.

(d) *Footwalks—clearances.* A footwalk shall be placed along the entire length of the bridge on the motor side, and a short platform twice the length of the trolley placed at one end of the girder on the opposite side, with a vertical clearance of at least 6 feet 6 inches when the design of the crane or building permits, but in no case shall there be less than 4 feet clearance. For hand operated cranes, the footwalk may not be required to be installed on the bridge of the crane, but there shall be a repair platform, equal in strength and design to that required for motor operated cranes, installed on the wall of the building or supported by the crane runway at a height equal to the lower edge of the bridge girder to facilitate necessary repairs.

(e) *Width of footwalks.* Clear width of footwalks shall be not less than 18 inches except around the bridge motor where it may be reduced to 15 inches.

(f) *Construction.* Footwalks for outside service shall be constructed so as to provide proper drainage, but the openings between the boards, sections of metal decking or floor plates shall not be wider than 1/4 inch.

(g) *Railings and toeboards.* Railings and toeboards shall conform with the following:

(1) Railings shall be capable of safely sustaining a vertical load of 80 pounds per linear foot and a horizontal thrust of 25 pounds per linear foot.

(2) The suggested inside diameter for pipe railings may not be less than 1 1/4 inches.

(3) Railings may be not less than 42 inches in height, with an additional rail midway between the top rail and the floor.

(4) Pipe railings may be not less than 1 1/4 inches inside diameter if of iron or be not less than 1 1/2 inches outside diameter if of brass tubing.

(5) Posts or uprights shall be spaced not more than 8 feet center to center.

(6) Toeboards shall be not less than 6 inches in height.

(7) Toeboards shall be constructed so as to be permanent and made of metal, wood or other substantial material. If made of wood, toeboards shall be at least equal in cross section to 1 inch by 6 inches; if made of steel at least 1/8 inch by 6 inches; and if made of other construction at least equal to the requirements for steel. Perforations up to 1/2 inch are permissible in metal toeboards.

(h) *Openings between footwalks and crane girders.* No opening shall be permitted between the bridge footwalk and the crane girders. If wire mesh is used to fill this opening, the mesh openings shall not be greater than 1/2 inch.

(i) *Platform strength.* All footwalks and platforms shall be designed so as to be capable of sustaining a uniformly distributed live load of 100 pounds per square foot.

Cross References

This section cited in 34 Pa. Code § 25.51 (relating to scope).

§ 25.54. Cages.

(a) *Means of escape.* Means of escape shall be provided for operators of hot metal cranes. This shall consist of a walkway accessible from the cage when in any position, or some other approved arrangement.

(b) *Location and size of cages.* The cage of the operator shall be located at a place from which signals may be clearly understood, and shall be securely fastened in place and well braced to minimize vibration. The cage shall be large enough to allow ample room for the control equipment and the operator. The operator may not be required to step over an open space of more than 18 inches when entering the cage.

(c) *Fire extinguisher.* An approved type fire extinguisher shall be carried in the cage.

(d) *Warning device.* In establishments where continuous loud noises prevail, such as caused by the operation of pneumatic tools, steam exhausts from boilers, and the like, audible type signalling devices shall be installed on cranes or one or more employees shall be placed on the floor for each crane operated to warn other employees of the approach of a crane with a load. If there are more than two cranes on the same runway or within the same building structure, signalling devices may not be required if a man is placed on the floor for each crane to give warning to other employees of the approach of a crane with a load.

(e) *Protection from heat.* Cages of cranes subjected to heat from below shall be of noncombustible construction and shall have a steel or aluminum plate shield not less than 6 inches below the bottom of the floor of the cage. If necessary an approved heat insulating material shall be provided in this space.

(f) *Outside cages.* Outside crane cages shall be enclosed and properly heated. There shall be windows on three sides of the cage. The windows in the front and the side opposite the door shall be the full width of the cage.

(g) *Cage floor extensions.* The floor of the cage on outdoor cranes shall be extended to form an entrance landing which shall be equipped with a handrail and toeboard of standard construction.

(h) *Rules for operators.* A durable copy of the rules for operators shall be permanently posted and maintained in the cages of all cage-operated cranes.

Cross References

This section cited in 34 Pa. Code § 25.51 (relating to scope).

§ 25.55. Rail stops, bumpers and fenders.

(a) *Rail stops and bumpers.* Rail stops shall be provided at both ends of the crane runway and at ends of the crane bridge. When two trolleys are operated on the same bridge rails, bumpers shall be provided between trolleys.

(b) *Heights.* Bumpers and rail stops shall extend at least as high as the centers of the wheels.

(c) *Fastening of rail stops.* Rail stops shall be fastened either to the girders or to girders and rails, but not to the rails alone. This does not apply to portable rail stops.

(d) *Rail stop construction.* Rail stops shall either be built up of plates and angles or be made of cast steel.

(e) *Fenders.* Fenders shall be installed which extend below the lowest point of the treads of the outside bridge truck wheels. They shall be of a shape and form that will push or raise the hand, arm or leg of a man off the rail and away from the wheel.

Cross References

This section cited in 34 Pa. Code § 25.51 (relating to scope).

GANTRY CRANES**§ 25.61. Special requirements.**

(a) *Fenders.* All bridge truck wheels shall be equipped with fenders which shall project in front of the wheels and extend slightly below the top of the rail in the same groove as the wheel flange or flanges.

(b) *Passageway.* An unobstructed passageway not less than 30 inches wide shall be maintained parallel to and extending the entire length of the tracks upon which any gantry crane is operated.

(c) *Stairways to platforms.* Where stairways are used to give access to platforms they shall be equipped with a substantial handrail.

(d) *Warning device.* An automatically operated bell or other effective warning device, which shall operate at all times while the crane is traveling, shall be provided on all gantry cranes. In addition, each trolley or similar part of a gantry crane shall be equipped with a manually operated bell, or other effective warning device, in all cases where persons may be endangered by the movement of a trolley or similar part.

(e) *Rail stops.* Rail stops shall be provided at both ends of the crane runway. The rail stops shall extend at least as high as the center of the wheels.

LOCOMOTIVE CRANES AND CRAWLER-MOUNTED CRANES**§ 25.71. Special requirements.**

(a) *Steps and handholds.* All locomotive cranes shall be provided with steps and handholds located so as to give convenient access to the cab, or operator's quarters.

(b) *Couplers.* If locomotive cranes are equipped with couplers, these shall be extended to clear the revolving tank end of the cab.

(c) *Load indicators.* Capacity plates shall be attached on all locomotive cranes. They shall clearly indicate the safe load in tons for maximum and minimum positions of the boom and for at least two intermediate positions. These indications shall be for loads both with and without the use of outriggers.

(d) *Swinging levers.* All "swinging" levers on locomotive cranes shall be provided with means to lock them in neutral position.

(e) *Warning device.* A warning device shall be provided on all locomotive cranes, and shall be sounded before cranes are put in motion and, if necessary, while the crane is travelling.

(f) *Tipping.* Provisions shall be made to prevent the tipping of locomotive cranes. Out-riggers and rail clamps shall be permissible.

§ 25.72. Guards.

(a) *Clutches.* When exposed to contact, all clutches on locomotive cranes shall be effectively guarded.

(b) *Shafting*. Revolving shafting on locomotive cranes, except shafting situated below the platform for purposes of propulsion, shall be effectively guarded.

(c) *Set screws*. Set screws on moving parts of locomotive cranes, except below the platform, shall be either of the countersunk type or covered by smooth cylindrical coverings so that no part of the set screw will project above the surface.

(d) *Crank disks*. When exposed to contact, all crank disks on locomotive cranes shall be guarded.

(e) *Gear sprockets*. When exposed to contact, all gears and sprockets on locomotive cranes shall be entirely enclosed or equipped with a band guard covering the face and having side flanges extending inward beyond the root of the teeth. All spoke and open web gears and sprockets which are over 18 inches in diameter, when exposed to contact, shall be entirely enclosed on exposed sides.

§ 25.73. Engines and boilers.

(a) Injector overflow pipes shall discharge downward.

(b) No boiler of a locomotive crane shall be operated at a pressure in excess of the maximum permissible working pressure as in Chapter 3a (relating to boilers and unfired pressure vessel regulations), and all boilers shall conform, in construction and design, to the requirements of the requirements for boilers.

§ 25.74. Cabs.

(a) The operator's platform shall be made of an anti-slip plate or of wood to reduce the slipping hazard. A wood slat mat shall be considered effective.

(b) The steam and exhaust piping in cabs shall be arranged to provide a clear passageway from one side of the cab to the other.

(c) Two doorways shall be provided, one on each side of the cab.

§ 25.75. Lighting.

(a) Sufficient light shall be provided in the cab of every crane to enable the operator to see clearly when working at night, and especially to see the water and steam gauges.

(b) When it is necessary to use a kerosene lamp it shall be constructed substantially of metal, supported in a permanent, rigid fixture, and fitted with a reflector to direct the light on the gauge glasses and operating levers.

(c) When the crane is moved about the plant a headlight and taillight shall be provided.

§ 25.76. Operation.

(a) *Signals*. Locomotive cranes shall not be moved except upon a signal from the authorized signalman. The regularly employed switchman shall give all signals to the operator. If signalmen or switchmen are not employed, an operator

may not move a crane except under orders of the foreman of the department in which the crane is operating.

(b) *Swinging of cranes.* A locomotive crane may not be swung across a railroad track or into a position that cars moving on another track would strike it, until the craneman and signalman have made sure that cars are not being moved on the adjacent track.

(c) *Passing buildings or structures.* When passing by corners of buildings or structures, the crane operator shall exercise care to insure that the crane is parallel with the truck.

(d) *Moving crane about yard.* When moving a crane about the yard, the operator shall see that the boom is carried low enough to clear all overhead wires.

(e) *Moving couplings.* No one except an authorized person may be allowed to make couplings or throw a switch.

(f) *Suspended weight.* When weight is suspended from the crane hook, the operator may not leave his position at the levers for any purpose.

HOISTS

§ 25.81. Chain and electric hoists.

(a) *Construction.* Chain and electric hoists shall be made of what is known as "all metal construction." No cast iron shall be used in parts subject to tension except drums, bearings or brake shoes.

(b) *Chains.* The chains shall be made of the best quality steel, iron or aluminum with welded links.

(c) *Factor of safety.* Chain and electric hoists shall have a factor of safety of at least five.

(d) *Braking devices.* Chain and electric hoists shall be equipped with an approved device which will automatically lock the load when hoisting is stopped.

(e) *Limit stops.* Electric hoists shall be provided with an approved limit stop to prevent the hoist block from travelling too far in case the operating handle is not released in time.

§ 25.82. Monorail hoists.

(a) *Side pulls.* Unless designed for making side pulls, a monorail hoist shall not be used to lift or move an object by a side pull.

(b) *Switch and turntable stops.* A stop shall be provided at all switches and turntables to prevent the trolley from running off should the switch be turned or left in the open position.

(c) *Safety catches.* All monorail hoists operating on swivels shall be equipped with one or more safety catches which will support the load, should a suspension pin fail. All trolley frames shall be safeguarded against spreading.

(d) *Rail stops.* Rail stops shall be provided at the ends of crane runways. The rail stops shall extend at least as high as the centers of the wheels.

§ 25.83. Air hoists.

(a) To prevent piston rod lock nuts from becoming loose and allowing the rod to drop when supporting a load, the lock nut shall be secured to the piston rod by a castellated nut and cotterpin.

(b) A clevis or other means shall be used to prevent the hoist cylinder from becoming detached from the hanger.

JIB, PILLAR AND PORTABLE FLOOR CRANES, CRABS AND WINCHES**§ 25.91. Construction, operation and maintenance.**

(a) *Side pulls.* Side pulls shall not be made with jib or pillar cranes. The arm or boom shall be directly over the load when making a lift.

(b) *Enclosing of gears.* The gears of all cranes shall be enclosed. If hand-operated by means of a crab or winch, a locking dog shall be provided to hold the load when the handle is released.

(c) *Brakes.* Some form of brake or safety-lowering device shall be provided on all crabs, winches and jib cranes.

(d) *Limiting device.* An approved hoist-limiting device shall be provided on all jib cranes of ten or more tons capacity.

SPECIAL REQUIREMENTS FOR NEW INSTALLATIONS**§ 25.101. Construction.**

(a) Cranes shall be of what is known as "all metal construction." No cast iron may be used in parts subject to tension except in drums, trolley sides, bearings, brackets and brake shoes.

(b) Bolts subject to stress shall be of the through type, and all bolts shall be equipped with approved protection so that the bolt will not work loose or nuts work off.

(c) Outside crane cages shall be enclosed. There shall be windows on three sides of the cage. The window in the front, and the side opposite the door shall be the full width of the cage.

§ 25.102. Floor operated overhead traveling cranes.

Means for effecting an automatic return to the off position shall be provided on controls of floor operated cranes and monorail hoists.

§ 25.103. Overhead traveling cranes.

Calculations for wind pressure on outside overhead traveling cranes shall be based on not less than 30 pounds per square foot of exposed surface.

SPECIAL REQUIREMENTS FOR EXISTING INSTALLATIONS

§ 25.111. Overhead traveling cranes.

Safety lugs or brackets shall be provided on the trolley frames and bridge ends of overhead traveling cranes, so that, in the event of a broken axle or wheel, the trolley or bridge proper will not drop more than one inch.

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